

REMARKS

Claims 1-49 were previously pending.

Claims 17-24 and 41-48 are withdrawn.

Claims 1-16, 25-40 and 49 are rejected.

Claims 1, 2, 3, 5, 8, 11, 12, 15, 25, 26, 27, 29, 32, 35, 36, and 49 are amended to correct typographical or idiomatic errors.

No new matter is added.

Claims 1-16, 25-40 and 49 remain in the case for consideration.

Applicant requests reconsideration and allowance of the claims in light of the following remarks.

Claim Rejections – 35 U.S.C. § 103

Claims 1-16, 25-40 and 49 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,372,967 Sundaram et al., (“Sundaram et al.”) in view of U.S. Patent No. 6,236,538 Yamada et al., (“Yamada et al.”).

The rejections are respectfully traversed.

The Examiner has argued that Sundaram teaches, “forming [a] cylindrical insulator” and “the groove is semicircle with an cylindrical insulator formed inside.”

On the contrary, Sundaram does not teach or suggest, “forming a cylindrical insulating layer in said groove formed with said underlying conductive lines and on the surface of said substrate,” as recited in claim 1 of the present application for the reasons as follows.

According to an embodiment of the present invention, to form a cylindrical insulator, after an oxidizable material 48 is planarized, “an oxidization process, which *expands the volume* [of] each of the oxidization portions, is performed on the oxidizable material 48a, 48b, ...the cylindrical insulator 50 is formed to a thickness that is greater than that of the peripheral insulators.” See the specification at page 8, lines 10-24 and FIGS. 9A, 9B of the present application. (Emphasis added)

As a result, the circular cross-section of conducting line coil overlying the resultant cylindrical insulator reduces abrupt changes in the magnetic field that would otherwise be caused by sharp turns in the coil. See FIG. 12A and the accompanying text of the present application.

In contrast, in Sundaram, no such process to form a cylindrical insulator is disclosed. With the trenches arranged in spiral patterns *alone*, a cylindrically shaped insulating core

cannot be formed as in the claimed invention. Instead, in Sundaram, the insulator 19 deposited in the trench is planarized “so that it is flush with the upper surface” of the surrounding layer. See column 3, lines 25-27 of Sundaram. Thus, Sundaram teaches away from “forming a cylindrical insulating layer in said groove formed with said underlying conductive lines and on the surface of said substrate,” as recite in claim 1 of the present application. Compare FIG. 5 of Sundaram with FIGS. 9A and 10A of the present application. Also see col. 6, lines 54-56 of Sundaram.

Moreover, the rectangular-shaped insulating core of Sundaram has the same problems as the prior art cited on page 4 of the specification. That is, abrupt changes in the magnetic field will be generated at the sharp corners of the Sundaram inductor because Sundaram teaches planarizing the insulator, the upper conducting lines in Sundaram necessarily lie flat across the top of the insulator as is shown in FIG. 5. Also, Yamada teaches in FIGS. 36 and 37 that the upper conductive lines are formed flat across the top of the trench.

Therefore, none of the cited references avoid the prior problems of abrupt changes in the magnetic field due to the sharp corners created by these flat upper conductive lines.

Also, the insulating layer 50 of the present invention is not a semicircular insulating layer, but a cylindrical insulating layer. With the semicircular insulating layer, the prior art problem of abrupt changes cannot be avoided. Abrupt changes in the magnetic field will also be generated at the sharp corners of the inductor structure resulting from the semicircular insulating layer. The semicircular insulating layer has the same problems as the prior art cited on page 4 of the specification. Therefore, none of the cited references teach or suggest the above-described recited aspects of the present invention.

For these reasons, the cited references, either alone or in combination, do not teach or suggest all of the limitations of claim 1. Accordingly, the rejection does not present a *prima facie* case of obviousness.

Therefore, claim 1 and claims 2-16, which depend from claim 1 and recite features that are neither taught nor disclosed in the cited references, are allowable.

Claim 25, which recites, “forming a cylindrical insulator above said lower conductive lines and aligned with the groove,” is allowable for the similar reasons discussed above. Also, claims 26-40, which depends from claim 25 and recite features that are neither taught nor disclosed in the cited references, are allowable. For example, none of the references teach or suggest, “filling said groove with an oxidizable material, and oxidizing said oxidizable material,” as recited in claim 35 of the present invention. Claim 49, which recites, “forming an inductor having a cylindrical cross-section in the groove,” is also allowable

because none of the cited references teach or suggest such a limitation of the claimed invention, for the reasons discussed above.

Further, it is well settled that a reference must provide some motivation or reason for one skilled in the art without the benefit of the applicant's specification to make the necessary changes in the disclosed device. The mere fact that a reference may be modified in the direction of the claimed invention does not make the modification obvious unless the reference *expressly or impliedly teaches or suggests* the desirability of the modification. *In re Gordon*, 221 USPQ 1125, 1127 (Fed. Circ. 1984); *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. App. 1985); *Ex parte Chicago Rawhide Mfg., Co.*, 223 USPQ 351, 353 (Bd. App. 1984).

For the reasons discussed above, the cited references fail to meet the basic requirement for a finding of obviousness established by the court in *Gordon*, *Clapp*, and *Chicago Rawhide*. There is no suggestion in the cited references of modifying the inventions disclosed therein in the direction of the present invention, nor is there any suggestion whatsoever of the desirability of such modification.

For example, the method of the cited reference to Yamada at column 25, lines 57-67, and shown in FIGS. 35A and 35B, includes forming the recess 11 on the substrate, not on an insulating layer on a substrate, followed by forming the conductive passages 21 and forming semicircular type layer 41 (and not a cylindrical insulator).

In addition, the Federal Circuit has provided that an Examiner must establish a case of *prima facie* obviousness. Otherwise the rejection is incorrect and must be overturned. As the court recently state in *In re Rijikaert*, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993):

“In rejecting claims under U.S.C. § 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness. Only if that burden is met, does the burden of coming forward with evidence or argument shift to the applicant. ‘A *prima facie* case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art.’ If the examiner fails to establish a *prima facie* case, the rejection is improper and will be overturned.” (citations omitted).

In the present invention, a series of acts such as the forming of a semicircular groove in an insulating layer and forming a cylindrical insulating layer produce the inductor having a cylindrically spiral shape. Consequently, *sharp turns in the conductors, which cause an abrupt change in the magnetic field, can be eliminated*. An increase in self-inductance can also be facilitated since the thickness of the insulator and the positional density of the conductive lines can be freely controlled. This unobvious aspects of the present invention is

not taught nor disclosed in any of the cited references. Therefore, the Examiner has not provided a *prima facie* case of obviousness.

In view of the foregoing, Applicant respectfully request that the rejections of claims 1-16, 25-40 and 49 under 103 be withdrawn.

Election/Restriction

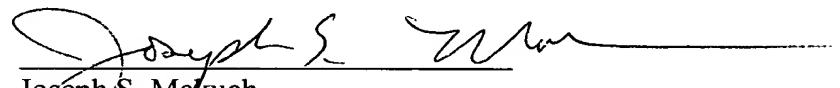
As stated in the Response to Office Communication filed by Applicant on October 9, 2002 and in Response to Office Communication filed by Applicant on March 20, 2003, claim 49 is generic. Claim 49 is allowable as discussed in the previous Responses. Therefore, the claims drawn to the non-elected species should no longer be considered withdrawn. (See MPEP 809.02(c)(B).) Applicant requests again that claims 17-24 and 41-48 be substantively examined.

For the foregoing reasons, reconsideration and allowance of claims -16, 25-40 and 49 of the application as amended is solicited. The Examiner is encouraged to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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Respectfully submitted,

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